



*“Quality You Can Trust...”
North America’s Largest Roofing Manufacturer”*

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September 18, 2006

Ms. Elaine Hebert
Energy Specialist (Efficiency)
California Energy Commission
1516 9th Street
Sacramento, CA 95814

e-mail: ehbert@energy.state.ca.us

Re: Proposed 2008 California Building Energy Efficiency Standards for Residential Roofs in Title 24.

Dear Ms. Hebert:

This letter and attachment are meant to contribute to the discussions and evaluations related to the proposed 2008 California Building Energy Efficiency Standards for Residential Roofs in Title 24. GAF Materials Corporation is committed to energy savings nationwide and, in particular, to the goal in California to reduce energy usage. However, we believe that the proposed Title 24 regulations are “cost negative” for California consumers and, as a result, should not be implemented in their current state.

The Warren-Alquist Act is the legislation that created the statutory authority for the California Energy Commission. This act requires that regulations result in a positive, cost effective result for California consumers. We interpret the requirement of “cost effective” to mean the economic benefit to the consumer, whether it is direct or indirect due to benefits to society, is greater than the direct investment required by the consumer.

The currently proposed requirements for steep slope roofing, as defined in the May 17, 2006 code change proposal that was posted by the California Energy Commission, does not meet the criteria of the Warren- Alquist Act. Specifically, the direct investment by the California consumer is far above the benefits provided to California in general and the consumer directly. Therefore is “cost negative” for the consumer.

The attached document will demonstrate several things that should help in your decision process:

1. **Actual Cost To Consumer**... over 85% of consumers in California will experience an increase in their cost of roofing; between 18 and 26% would shoulder a significant increase in an expense that is already a major burden
2. **Limited Benefit to Consumers**... the United States Department of Energy Steep Slope Calculator (available on the DOE website) provides results that demonstrate an inability for the consumer to recover costs. Further, the PIER presentation published by the Public Interest Energy Research Group and presented May 19, 2006 in Sacramento significantly understates the actual costs associated with meeting the proposed regulations. Even if the benefits provided by the PIER report are directionally correct, the actual costs result in an overall negative economic impact to the consumer. Since the costs of a replacement roof are immediate and the limited benefits accumulate over 30 years, this is an especially poor investment for consumers.
3. **Effect on California**... using the PIER report estimates of “savings” (\$38 million) and the estimates of burden for the property owner demonstrated in this document, the negative effect on the State economy is optimistically a quarter billion dollars annually and likely one-half billion dollars annually.
4. **Other Options That Achieve Your Goals**... very minimal investments in increased attic insulation and/or the installation and use of “Whole House Fans” generate a significant positive return for the California consumer; investments in these options are more likely to achieve CEC goals versus proposed regulations related to roofing.

We appreciate your consideration of the facts attached. GAF fully supports the goals and objectives of the California Energy Commission. As North America’s largest roofing manufacturer, GAF participates in the LBNL/PIER Industry Partners Group, which contributes to education related to Title 24. With factories and several hundred employees residing in California, we are fully invested in helping provide California consumers their “best and safest choice” in roofing.

If you have further questions or comments, please contact Helene Hardy Pierce, Executive Director, Technical Services at GAF – at 973-872-4263.

Sincerely,

The GAF Team
Helene Hardy Pierce,
Executive Director

Michael Sestrick
Vice President

David A. Harrison
Senior Vice President

Facts and Comments to Consider
2008 California Building Energy Efficiency Standards for Residential Roofs in Title 24

Warren-Alquist Act Provides Authority For Energy Commission	<p>Warren-Alquist Act is the legislation that created and gives the statutory authority to the California Energy Commission. This act requires that regulations result in a positive cost effective result for California consumers.</p> <p>We interpret the requirement of “cost effective” to mean that the economic benefit to the consumer, whether direct or indirect due to benefits to society, is greater than the direct investment required by the consumer.</p>																																												
Warren-Alquist Act Included Specific Concerns Related to Lower Income Consumers	<p>Within the 471 page document, there are several references that suggest that the legislators that chartered this act were very concerned that lower income consumers in California specifically are not adversely affected by the results of any regulation.</p>																																												
Two Primary Sources That Define the Economic Benefit For the Consumer	<p>There are two key sources used to determine the economics of a reflective roof:</p> <ol style="list-style-type: none">1. United States Department of Energy... Steep Slope Calculator (available on the DOE website)2. PIER Report, “Inclusion of Solar Reflectance and Thermal Emittance Prescriptive Requirements for Steep-Sloped Roofs in Residential Title 24”, presented by Dr. Hashem Akbari on May 19, 2006 in Sacramento; this report seems to be a significant basis of the proposed standard																																												
United States Department Of Energy (“DOE”) Calculator Shows Consumer Benefit Less than \$17 Per Year For California Consumers	<p>The table below shows the savings from switching from a standard black shingle (lowest solar reflectance) to a higher reflectance shingle. In the proposed code, the initial reflectance requirement is 0.27; the three-year aged requirement is 0.25. Tithe average California home today, given the mix of colors California consumers have chosen, has a reflectance of 0.11</p> <p>Assumptions:</p> <ul style="list-style-type: none">• Average Home – 2,000 Square Feet• Compares To Black Roofs – Reflectivity of 0.05• Summer Time Cost Of Electricity: “High” (worst case)• Air Conditioner Efficiency: “Average”• Heating System Efficiency: “Average” <p>Web address: www.ornl.gov/sci/roofs+walls/SteepSlopeCalc/index.htm</p> <table><tr><td></td><td colspan="3"><u>\$ Savings Per Year – Average Home</u></td></tr><tr><td></td><td colspan="3"><u>Switching From Reflectivity of 0.05 (black) To:</u></td></tr><tr><td><u>Location</u></td><td><u>0.27</u></td><td><u>0.25</u></td><td><u>0.11</u></td></tr><tr><td><u>Attic R-Value 19</u></td><td></td><td></td><td>(avg home today)</td></tr><tr><td>• Sacramento</td><td>\$ 5.40</td><td>4.80</td><td>1.00</td></tr><tr><td>• Bakersfield</td><td>16.60</td><td>14.60</td><td>3.20</td></tr><tr><td>• Fresno</td><td>12.20</td><td>10.80</td><td>2.40</td></tr><tr><td><u>Attic R-Value 30</u></td><td></td><td></td><td></td></tr><tr><td>• Sacramento</td><td>\$ 3.20</td><td>2.80</td><td>0.60</td></tr><tr><td>• Bakersfield</td><td>10.40</td><td>9.20</td><td>2.00</td></tr><tr><td>• Fresno</td><td>7.60</td><td>6.80</td><td>1.40</td></tr></table> <p>Note: Assumes zero cost for higher reflective product. Impact of product cost below.</p>		<u>\$ Savings Per Year – Average Home</u>				<u>Switching From Reflectivity of 0.05 (black) To:</u>			<u>Location</u>	<u>0.27</u>	<u>0.25</u>	<u>0.11</u>	<u>Attic R-Value 19</u>			(avg home today)	• Sacramento	\$ 5.40	4.80	1.00	• Bakersfield	16.60	14.60	3.20	• Fresno	12.20	10.80	2.40	<u>Attic R-Value 30</u>				• Sacramento	\$ 3.20	2.80	0.60	• Bakersfield	10.40	9.20	2.00	• Fresno	7.60	6.80	1.40
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<p>“DOE” Analysis – Best Case Savings For California Consumer Over 30 Years Is Less Than A Net Savings Of \$342</p> <p>(Net is Based on the Change from Average Reflectance to Proposed – No Product Cost Impact)</p>	<p>We are the largest roofing manufacturer in California; our sales data shows that the market is less than 20% for black (charcoal colored) asphalt shingles. The California consumer enjoys multiple blends of colors that increase the appearance and the resulting re-sale value of their homes. In reality the average reflectance in California today is not 0.05 (black) but is closer to 0.11 based upon the consumers’ color selections/purchases (weighted average reflectance).</p> <p>Using the calculations from the Department of Energy above and using a “best case” evaluation of benefit, the data shows a minimal benefit for the California consumer upon achieving an initial reflectance of 0.27, or a 3-year aged reflectance of 0.25, versus a reflectance of 0.11, the average reflectance of asphalt shingle roofs purchased by California consumers today.</p> <p>Assuming:</p> <ul style="list-style-type: none">• Average 2,000 square foot home, XX squares of roofing (1 square = 100 ft²)• 30 years of benefit• no “discount rate” for the cost of money• attic R-Value is 19 <table><tr><th colspan="5"><u>\$ Savings Over 30 Years – Average Home Switching From Reflectivity of 0.05 (black) To:</u></th></tr><tr><th><u>Location</u></th><th><u>0.27</u></th><th><u>0.25</u></th><th><u>0.11</u> (avg. home)</th><th><u>Net Savings</u> <u>0.25 Vs. 0.11</u></th></tr><tr><td>• Sacramento</td><td>\$162</td><td>144</td><td>30</td><td>114</td></tr><tr><td>• Bakersfield</td><td>498</td><td>438</td><td>96</td><td>342</td></tr><tr><td>• Fresno</td><td>366</td><td>324</td><td>72</td><td>252</td></tr></table> <p>Note: Assumes zero cost for higher reflective product. Impact of product cost below.</p>	<u>\$ Savings Over 30 Years – Average Home Switching From Reflectivity of 0.05 (black) To:</u>					<u>Location</u>	<u>0.27</u>	<u>0.25</u>	<u>0.11</u> (avg. home)	<u>Net Savings</u> <u>0.25 Vs. 0.11</u>	• Sacramento	\$162	144	30	114	• Bakersfield	498	438	96	342	• Fresno	366	324	72	252
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<p>PIER Reported Savings Show Cumulative Savings – Best Case Is \$790 For 1,000 Square Feet (Zone 15 TDV Value)</p>	<p>This report projected savings for California consumers by switching to higher reflective roofing systems.</p> <p>Assumptions In Model</p> <ul style="list-style-type: none">• Calculations per 1,000 square feet• 30 years of benefit• Analysis of discount of “cash flow benefit” appears to be 3%• Achieving initial reflectivity of 0.27; three year aged of 0.25• “TDV” (time dependant valuation) which is “best case” <table><tr><th colspan="3"><u>\$ Savings - Best Case Climate Zones In Analysis Switching From Black to Proposed Code Compliance</u></th></tr><tr><th><u>Zone</u></th><th><u>Example City</u></th><th><u>30 Years “NPV” Savings</u> <u>1,000 Square Feet</u></th></tr><tr><td>15</td><td>none (desert)</td><td>\$790</td></tr><tr><td>13</td><td>Bakersfield/ Fresno</td><td>632</td></tr></table> <p>Note:</p> <ul style="list-style-type: none">• The projected savings for the entire state was forecast at \$38 million• There are a total of 16 zones evaluated in this study; zones 15 and 13 demonstrate the highest level of savings. Assumes zero cost for higher reflective product. Impact of product cost below.	<u>\$ Savings - Best Case Climate Zones In Analysis Switching From Black to Proposed Code Compliance</u>			<u>Zone</u>	<u>Example City</u>	<u>30 Years “NPV” Savings</u> <u>1,000 Square Feet</u>	15	none (desert)	\$790	13	Bakersfield/ Fresno	632													
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<p>PIER Analysis Demonstrates The Average Savings To A Consumer Is At Most \$53 Per Year</p>	<p>Assumptions In Model</p> <ul style="list-style-type: none">• Average Home of 2,000 Square Feet• Average Roof of 25 Squares (100 ft² = 1 square)• Same assumptions as above in PIER Report <table><tr><th colspan="4"><u>\$ Savings Per Home – Best Case Climate Zones Switching From Black to Proposed Code Compliance</u></th></tr><tr><th><u>Zone</u></th><th><u>Example City</u></th><th><u>Savings Over</u> <u>30 Years</u></th><th><u>Annual</u> <u>Savings</u></th></tr><tr><td>15</td><td>none (desert)</td><td>\$1,580</td><td>\$53</td></tr><tr><td>13</td><td>Bakersfield/ Fresno</td><td>1,264</td><td>42</td></tr></table> <p>Note: there are a total of 16 zones evaluated in this study; zones 15 and 13 demonstrate the highest level of savings. Assumes zero cost for higher reflective product. Impact of product cost below.</p>	<u>\$ Savings Per Home – Best Case Climate Zones Switching From Black to Proposed Code Compliance</u>				<u>Zone</u>	<u>Example City</u>	<u>Savings Over</u> <u>30 Years</u>	<u>Annual</u> <u>Savings</u>	15	none (desert)	\$1,580	\$53	13	Bakersfield/ Fresno	1,264	42									
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<p>PIER Analysis Combined With “DOE” Calculation Of Actual Reflectance (vs. all black) Lowers Projected Savings By 21%</p>	<p><i>In the “DOE” model, the actual savings for a roof with a reflectance of 0.25 is reduced by 21% because the average roof color is lighter than the black roof color used by the calculator.</i></p> <p>Assumptions:</p> <ul style="list-style-type: none">• Black (charcoal) reflectance is 0.05• Average reflectance is 0.11• Savings already achieved is 21% of total (using DOE calculator) <p style="text-align: center;"><u>\$ Savings Per Home – - Best Case Climate Zones Switching From Typical Colors Today To Proposed Code Compliance</u></p> <table><tr><th><u>Zone</u></th><th><u>Example City</u></th><th><u>Savings Over 30 Years*</u></th><th><u>Annual Savings*</u></th></tr><tr><td>15</td><td>none (desert)</td><td>\$1,248</td><td>\$42</td></tr><tr><td>13</td><td>Bakersfield/ Fresno</td><td>999</td><td>33</td></tr></table> <p>* Values represent 21% reduction (explained above) from raw data.</p> <p><i>Note: there are a total of 16 zones evaluated in this study; zones 15 and 13 demonstrate the highest level of savings. Assumes zero cost for higher reflective product. Impact of product cost below.</i></p>	<u>Zone</u>	<u>Example City</u>	<u>Savings Over 30 Years*</u>	<u>Annual Savings*</u>	15	none (desert)	\$1,248	\$42	13	Bakersfield/ Fresno	999	33
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<p>Raw Material Cost (Solar Reflective Granule) Increase To The Manufacturer Of Asphalt Shingles Is Approximately \$30 Per Square</p>	<p><i>Letter Dated September 15, 2006 to GAF Materials Corporation:</i></p> <p>“You asked ISP Minerals for the estimated cost of solar reflective granules that would allow an asphalt shingle manufacturer to achieve the 0.27 initial reflectance being considered for the 2008 California Building Energy Efficiency Standards for Residential Roofs in Title 24.</p> <p>For budget purposes, an asphalt shingle manufacturer should plan for an approximate additional cost for Solar Shield reflective roofing granules of \$30.00 per square over the current equivalent ISP provided colored roofing granules without reflective properties. This is a weighted average number based on an evaluation of the overall mix of granule colors and blends that California property owners have historically purchased. As you know, the color blends are chosen by consumers in order to enhance the appearance of their home and as such, this can affect the re-sale value of their home.”</p> <p><i>Robert Toth ISP Minerals</i></p> <p><i>Note: ISP Minerals is one of the two primary suppliers of granules to the asphalt roofing industry.</i></p>												

Increased Burden For The Average Consumer For Solar Reflective Asphalt Roofing Shingles of at Least \$1,176	Assuming Average:		
	<ul style="list-style-type: none">• 2,000 square foot home• 25 squares of roofing per home (1 square = 100 ft²)• Distributor margin optimistically 15%; probable 25%• Contractor margin optimistically 25%; probable 35%• Price per square of current roofs is optimistically \$250/square; probable \$350		
	Incremental Cost Per Square Asphalt Roofing Shingle		
		<u>Optimistic</u>	<u>Probable</u>
	Cost Of Granules	\$25	\$30
	Incremental Cost Of Manufacturing	5	15
	<ul style="list-style-type: none">• Duplicate Inventories (only used in 70% of California)• Equipment and Modifications• Possible Process Changes (slower line speeds)• Possible Granule Changes (smaller size)		
	Incremental Cost of Roofing Per Square To:		
	<ul style="list-style-type: none">• Distributor• Contractor• Price To Home Owner (per square)	\$30.00 35.30 47.05	\$45.00 60.00 92.39
		Increased Price For Entire Roof	\$1,176
	Current Price Of Average Roof	\$6,250	\$8,750
	% Increase In Roof System	18%	26%
The Result For The Average California Consumer Is “Net Negative” – The Consumer Is Worse With This Proposed Regulation	The Math For The Consumer		
	30 Year Analysis – Zone 15 (desert)		
		Cost	
		Optimistic	Probable
		\$1,176	\$2,310
		Best Case Savings	
	PIER Calculation	1,248	
		Net Consumer Economics	
		Optimistic	Probable
	PIER Calculation	\$72	(\$1,062)

	30 Year Analysis – Zone 13 (Bakersfield and Fresno)		
		Cost	
		Optimistic	Probable
		\$1,176	\$2,310
		Best Case Savings	
	DOE Calculation		
	Fresno	\$252	
	Bakersfield	342	
PIER Calculation	999		
	Net Consumer Economics		
	Optimistic	Probable	
DOE Calculation			
Fresno	(\$924)	(\$2,058)	
Bakersfield	(\$834)	(\$1,968)	
PIER Calculation	(\$177)	(\$1,311)	
Notes:			
a) zones 15 and 13 are the “best case” savings with reflective shingles			
b) brackets are for “negative” results			
c) the only positive outcome - \$72 – becomes negative when putting in any “discount factor” due to the time value of money. Even the PIER model assumes this should be at least 3%			
d) savings for the California consumer are likely worse since these numbers use “best case” savings models.			

<p>Technology Does Not Currently Support An Ability To Achieve The Proposed Initial Or 3-Year Aged Reflectivity Values</p>	<p>The asphalt roofing industry represents about 85% of all roofs sold in California (according to 2005 studies and documents from FW Dodge and 3M). Asphalt shingles are popular with California consumers because of their low installed costs and great weather performance. The asphalt roofing industry has the technology to achieve an initial 0.27 on few colors. It is unknown whether the 0.25 aged requirements can be achieved; to date, we know of no shingle that has met this requirement.</p> <p>The technology does not exist to achieve an initial reflectance of 0.27 and three-year aged reflectance of 0.25 on color blends enjoyed by California consumers. Here's why:</p> <ul style="list-style-type: none"> • <u>Granule Coverage Is Not 100%...</u> there is always "bleed through" of the non-reflective asphalt, which provides the key waterproofing performance consumers require to keep their homes safe and secure. • <u>Darker Colors Are Less Reflective...</u> even with state of the art granule technology, darker colors are simply not as reflective <p>Even Elk, which markets a premium priced shingle that achieves an initial reflectivity on a limited color assortment, has informed PIER and the California Energy Commission that it cannot currently achieve the three-year aged criteria proposed. Numerous distributors and contractors in California claim that this high reflectance Elk shingle has been exceptionally unsuccessful in generating interest and sales because the color line is limited and the blends are much less vibrant (attractive) than industry standards; Elk admits in an on-line PowerPoint presentation (CEC website) that was submitted to the California Energy Commission that its sales of "cool shingles" are less than 1% of its California volume.</p>				
<p>The Homeowners in Zones Affected By This Proposal Are Least Able To Afford The Increased Cost</p>	<p>The proposed legislation covers climate zones 9-16 and excludes zones 1-8. This results in much more hardship for those who are least able to afford the increased investment in their roofing system:</p> <table data-bbox="711 919 1360 1010"> <thead> <tr> <th><u>Avg Per Capita Income Zones 1-8</u></th><th><u>Avg. Per Capita Income Zones 9-16</u></th></tr> </thead> <tbody> <tr> <td>\$43.5k</td><td>\$27.9k</td></tr> </tbody> </table> <p>Result: income is 36% lower in the zones impacted (i.e. those least able to afford this large incremental cost of their roof system)</p> <p>Source: US Department of Commerce, Bureau of Economic Analysis, 2005</p>	<u>Avg Per Capita Income Zones 1-8</u>	<u>Avg. Per Capita Income Zones 9-16</u>	\$43.5k	\$27.9k
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\$43.5k	\$27.9k				
<p>Regulations Encouraging Whole House Fans Likely Generate A Much Better Investment And Reduce Energy Consumption</p>	<p>Whole house fans are a great technology for reducing energy use. Awareness and usage of the benefits of whole house fans is not high.</p> <p>Typical Scenario</p> <ul style="list-style-type: none"> • People leave their air conditioner on during the day, so that their home will be comfortable when they get home <p>How Whole House Fans Work</p> <p>Step 1: Turn down/off air conditioner when leaving in the morning Step 2: When arrive home in the early evening, open windows (now cooler outside) Step 3: Turn on whole house fan Step 4: Only if necessary, turn on/up air conditioner to further cool the home; often, this step will not be necessary – the whole house fan can quickly exhaust warm interior air and keep the home cool throughout the night.</p> <p>The Economics</p> <ul style="list-style-type: none"> • Installation Of Whole House Fans... typically less than \$300 per home • Air Conditioning...typically 20 cents per hour; assuming a decrease in usage of an average of only 1 hour per day would result in annual benefits of about \$75; the payback is therefore less than five years; this is much better than "cool roofing" <p>Source: US Department of Energy – Publication "Whole House Fan – How To Install and Use"</p>				

Increased Insulation Provides Substantial Savings For California Consumers With Limited Investment	<p>Using the United States Department Of Energy (“DOE”) Calculator demonstrates energy savings for the consumer for a low dollar investment.</p> <p>Assumptions:</p> <ul style="list-style-type: none">• Installed cost is \$0.17/square foot/ per inch thickness• Used “blown in” insulation - \$.340/ inch• Average home 2,000 square feet <p style="text-align: center;">Amount Of Insulation Needed To Achieve Equivalent Savings As Shingles With a 0.25 Reflectance</p> <table><tr><td><u>Location</u></td><td colspan="2"><u>Insulation Needed/ Home</u></td></tr><tr><td></td><td><u>R-19</u></td><td><u>R-30</u></td></tr><tr><td>• Sacramento</td><td>0.08 inches</td><td>0.11 inches</td></tr><tr><td>• Bakersfield</td><td>0.22</td><td>0.34</td></tr><tr><td>• Fresno</td><td>0.16</td><td>0.24</td></tr></table> <p style="text-align: center;">Theoretical Investment Required/ Home</p> <table><tr><td></td><td><u>R-19</u></td><td><u>R-30</u></td></tr><tr><td>• Sacramento</td><td>\$27.20</td><td>\$ 37.40</td></tr><tr><td>• Bakersfield</td><td>74.80</td><td>115.60</td></tr><tr><td>• Fresno</td><td>54.40</td><td>81.60</td></tr></table> <p>These costs compare to an increased investment in a typical roof of at least \$1,300 over what consumers pay today for their roofs (and likely a factor of more than double this cost). In other words, an investment in insulation provides at least a 1,000 % greater rate of return on energy than investment in a reflective asphalt roof.</p> <p>Note: these are theoretical benefits and investments in insulation; consumers would not in actuality “blow in” such a small amount of insulation. This analysis simply demonstrates that insulation provides a tremendous return on investment in energy.</p> <p>Source: DOE Energy Calculator; RS Means Residential Cost Data 2006</p>	<u>Location</u>	<u>Insulation Needed/ Home</u>			<u>R-19</u>	<u>R-30</u>	• Sacramento	0.08 inches	0.11 inches	• Bakersfield	0.22	0.34	• Fresno	0.16	0.24		<u>R-19</u>	<u>R-30</u>	• Sacramento	\$27.20	\$ 37.40	• Bakersfield	74.80	115.60	• Fresno	54.40	81.60
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• Bakersfield	74.80	115.60																										
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Roof Replacements Are Typically A Necessity – Not A Choice	<p>The 300,000+ property owners in California that re-roof each year with asphalt shingles (the most economical choice) are not purchasing a roof because they want to – it’s a necessity.</p> <table><tr><td></td><td><u>Reasons For Re-Roof</u></td></tr><tr><td>Too Old</td><td>38%</td></tr><tr><td>Leaking</td><td>30</td></tr><tr><td>Wind Damage</td><td>19</td></tr><tr><td>Deterioration</td><td>7</td></tr><tr><td>Sub-Total</td><td>94% necessity</td></tr><tr><td>Appearance</td><td>5</td></tr><tr><td>Other</td><td>1</td></tr><tr><td></td><td>100%</td></tr></table> <p>Source: 3M 2006 Study (3M is one of the two largest suppliers of granules for asphalt roofing).</p>		<u>Reasons For Re-Roof</u>	Too Old	38%	Leaking	30	Wind Damage	19	Deterioration	7	Sub-Total	94% necessity	Appearance	5	Other	1		100%									
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<p>“Prescriptive” Vs “Requirements” Does Not Mirror Reality of the California Home Improvement Industry</p>	<p>When discussing this proposal, there are some advocates who state that the consumer is not forced to buy a reflective roof at the tremendous increase in investments that this document has demonstrated. The reality is that this assumption is incorrect.</p> <p>Prescriptive Definition By installing at the same time as the roof, other energy efficient methods including but not limited to windows, doors, insulation, and HVAC modifications, the consumer is not required to achieve the reflective roof requirement.</p> <p>Some Problems With “Prescriptive”</p> <ul style="list-style-type: none"> • High Investment... especially for lower income consumers, adding these other costs to an already large need for cash can result in hardship. • Difficult Analysis... determining energy trade-offs requires technical expertise that will likely require the additional investment in an architect or an engineer – that is an especially harsh burden for lower income California consumers. • Timing... when a roof is leaking, it needs to be replaced – quickly. There is not necessarily the time to identify, evaluate and implement prescriptive measures. • Availability... if this regulation is implemented, it is unlikely that distribution channels will be economically capable of supplying shingles both with and without these high cost solar reflective granules and allowing consumer choice. That means that consumers in Zones 1-9 (not included in the regulation) may very well be forced to purchase higher reflective material which results in an even higher negative cost impact to these consumers. 																
<p>Roofing Is Already A Very Challenging Investment For Consumers</p>	<p>According to a study by 3M in 2006, the investment in roofing is significantly greater than other major home improvement replacement projects for consumers.</p> <table data-bbox="516 890 1260 1136"> <thead> <tr> <th><u>Category</u></th><th><u>Cost Index – Major Home Improvements</u></th></tr> </thead> <tbody> <tr> <td>Doors</td><td>100%</td></tr> <tr> <td>Plumbing</td><td>114</td></tr> <tr> <td>Siding</td><td>124</td></tr> <tr> <td>Windows</td><td>284</td></tr> <tr> <td>HVAC</td><td>318</td></tr> <tr> <td>Roofing</td><td><u>441</u></td></tr> <tr> <td>Avg.</td><td>230%</td></tr> </tbody> </table> <p>Roofing is almost twice the investment for the typical home owner than other major home replacement projects. Increases in roof investments therefore increase the burden even more.</p>	<u>Category</u>	<u>Cost Index – Major Home Improvements</u>	Doors	100%	Plumbing	114	Siding	124	Windows	284	HVAC	318	Roofing	<u>441</u>	Avg.	230%
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<p>Thousands Of California Property Owners Will Be Adversely Affected</p>	<p>Industry estimates of total roofs installed in California are about 320,000 re-roofs and 80,000 new construction per year.</p> <table data-bbox="516 1350 1052 1440"> <tbody> <tr> <td>Asphalt Shingles</td><td>9MM</td></tr> <tr> <td>All Other Steep Slope Products</td><td><u>2MM</u></td></tr> <tr> <td>Total</td><td>11MM Squares</td></tr> </tbody> </table> <p>Assuming squares per roof is 28: Total California Homes – Roofed per Year - 400k</p> <p>Assuming 80% are re-roofs versus new homes Total California Homes Re-Roofed per Year - 320k</p> <p>Sources: Asphalt Roofing Manufacturers Association (ARMA), FW Dodge, 3M</p>	Asphalt Shingles	9MM	All Other Steep Slope Products	<u>2MM</u>	Total	11MM Squares										
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Overall the State of California and Its Residents Will Be Economically Injured If This Regulation Remains as Proposed	Summary Statistics Assuming <ul style="list-style-type: none">70% of California residents are affected by this regulation State Of California – Total Economic Impact Of Regulation Asphalt Shingles <table><thead><tr><th></th><th>Optimistic</th><th>Probable</th></tr></thead><tbody><tr><td>Total Squares</td><td>6.3MM</td><td>6.3MM</td></tr><tr><td>Cost To Consumer (per square)</td><td>\$47</td><td>\$92</td></tr><tr><td>Total Cost of Technology To California</td><td>\$296 million</td><td>\$580 million</td></tr><tr><td>Total Benefit to California (per PIER Report)</td><td>\$38 million</td><td>\$38 million</td></tr><tr><td>Annual Net Negative - California</td><td>(\$258 million)</td><td>(\$542 million)</td></tr></tbody></table>				Optimistic	Probable	Total Squares	6.3MM	6.3MM	Cost To Consumer (per square)	\$47	\$92	Total Cost of Technology To California	\$296 million	\$580 million	Total Benefit to California (per PIER Report)	\$38 million	\$38 million	Annual Net Negative - California	(\$258 million)	(\$542 million)
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Questions Or Comments?	Helene Hardy Pierce, Executive Director	Michael Sestrick Vice President	David A. Harrison Senior Vice President																		
Please Let Us Know	hpierce@gaf.com	msestrick@gaf.com	dharrison@gaf.com																		